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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VIII
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Ref: 8HWM-SM

MEMORANDUM

TO: Mike McCeney, RPM
Richardson Flats Tailings

FROM: Chris Weis, Toxicologist
Superfund Technical Section

SUBJECT: Richardson Flats Preliminary Health Assessment

I have reviewed the *July 24, 1990, Preliminary Health Assessment* conducted by the Agency for Toxic Substances and Disease Registry (ATSDR) for the Richardson Flats Tailings Site.

The data presented is inadequate to complete even a cursory risk assessment for the site. However, I have compiled the following qualitative comments regarding the ATSDR report.

(1) **Groundwater:** The results of the unfiltered water samples indicate extremely elevated levels of contaminants. The following table depicts the results of the groundwater analysis compared to current USEPA MCLs and other guidance:

CONTAMINANT	RFT GROUNDWATER (ppb)	MCL
Arsenic	349	50[a]
Cadmium	48	10
Chromium	104	100
Lead	1080	5[b]

[a]the MCL for Arsenic may be expected to change in the near future. Presently, the RfD workgroup recommends an RfD between 0.1 and 1.0 ug/kg/day based upon hyperpigmentation of skin as an endpoint. This would correspond to a drinking water advisory of somewhere between 0.7 and 7 ug/L (ppb).

[b]at the source.

The ATSDR Health Assessment indicates that two private domestic wells are located 4000 feet southwest of the site at depths of 210 feet. Screened intervals for these wells are not provided in the Health Assessment. The Health Assessment indicates that groundwater flow is to the northwest.

Due to the extremely high concentrations of contaminants in

the groundwater and the nature of the toxicity of the metals indicated--particularly lead, I recommend **immediate** confirmation that domestic wells are not affected by site contaminants.

Residents exposed over a short period of time to concentrations of lead indicated in the Health Assessment are at extreme risk. Both filtered and unfiltered samples should be collected at all residential wells which may be affected.

Irrigation of gardens and grain crops with contaminated water may be an important pathway of exposure for both human and livestock populations in the area.

(2) **Surface water**: Concentrations of metals in surface water are elevated. Most likely, human exposure to surface water constitutes a minimal exposure pathway. I recommend contacting an aquatic toxicologist within the Region to assess the potential ecological damage which might result from the elevated metals in surface water.

(3) **Soils**: Sampling results for surface soils are poorly documented in the ATSDR Health Assessment. Absence of information pertaining to sample location, sampling technique, analytical methodology, soil pH, particulate size, metal speciation, etc., make assessment of potential risk very uncertain.

Concentrations of arsenic, cadmium, and lead appear to be elevated in surface and subsurface samples onsite and offsite. As indicated in the Health Assessment, data presented as "background" is unlikely to represent a true background concentration for the area. Data is not presented to establish "true" background concentrations.

Experience with mining sites tells us that: (a) concentrations of total metals in the range of those presented in the Health Assessment may pose both short-term and long-term health threats in residential areas; and (b) the incidental soil ingestion pathway may represent the principal pathway of exposure on such sites.

Windblown deposition of metals onto residential gardens and onto forage crops may present an important pathway for exposure. Data to quantify the potential exposure is not available in the Health Assessment.

(4) **Air**: Evidence that windborne contamination may be moving offsite is presented in Tables 3 and 4 of the ATSDR Health Assessment.

The direct inhalation of contaminated particulates on or off site is likely to contribute only minimally to potential risk.

However, deposition of airborne dust which contains heavy metals may accumulate so as to greatly increase potential risk via the incidental ingestion of outdoor and housedust, ingestion of garden vegetables or grains or ingestion of livestock which might graze on dusted forage.

CONCLUSIONS/RECOMMENDATIONS:

(1) Immediately confirm concentrations of metals in domestic or municipal wells which may be impacted by the site. Determine metal concentrations in both filtered and unfiltered samples and purged and unpurged tap samples for domestic wells.

(2) Further sampling of surface soils is indicated by the available data. Sampling efforts should be designed to determine: (1) background concentrations of metals; (2) extent of contamination of surficial soils in present or potential future residential areas; (2) metal concentrations in particulate size of concern (<150 um) throughout residential areas; and (3) geochemical and geophysical characteristics of the waste as it relates to potential risk.

Prior to further sampling, available data packages should be thoroughly screened for risk-related information and data.

(3) Regional aquatic/ecological toxicologists should be consulted regarding potential for environmental risk.

cc: P. Arell
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